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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WHITTINGTON, KENNETH	
ART UNIT	PAPER NUMBER
2858	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/585,585	RUETZ, CHRISTIAN	
	Examiner	Art Unit	
	KENNETH J. WHITTINGTON	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/10/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 24-28, 30-32 and 44-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaiser et al. (US5646523), hereinafter Kaiser.

Regarding claim 24, Kaiser discloses a steering angle sensor for measuring a steering angle of a steering wheel mounted to a steering column, the steering column having an axis of rotation (See FIGS. 1a-1b, note item C), the sensor comprising:

a main rotor, said main rotor coupled to the steering column or to the steering wheel for synchronous rotation therewith about the steering column axis of rotation (See FIGS. 1a-1b, item 2);

a least one additional rotor disposed for rotation about the steering column axis of rotation (See FIGS. 1a-1b, item 7);

a first scanning unit for scanning a rotational angular position of said main rotor (See FIGS. 1a-1b, items 5);

a second scanning unit for scanning a rotational angular position of said additional rotor (See FIGS. 1a-1b, items 8); and

at least one gear member cooperating between said main rotor and said additional rotor, said gear member being driven by said main rotor and driving said additional rotor (See FIGS. 1a-1b, item 11).

Regarding claim 25, Kaiser discloses an evaluation unit for determining the rotational angular position of said main rotor and the rotational angular position of said additional rotor (See FIGS. 1a-1b, item 13).

Regarding claim 26, Kaiser discloses an axis of rotation of said main rotor is coaxial to the axis of rotation of the steering column (See FIGS. 1a-1b, note positioning of rotor 2 and shaft C).

Regarding claim 27, Kaiser discloses an axis of rotation of said additional rotor is coaxial to the axis of rotation of the steering column (See FIGS. 1a-1b, note positioning of rotor 7 and shaft C).

Regarding claim 28, Kaiser discloses an axis of rotation of said main rotor and an axis of rotation of said additional rotor are coaxial with respect to each other (See FIGS. 1a-1b, note positioning of rotor 2 and rotor 7).

Regarding claim 30, Kaiser discloses said main rotor and said additional rotor are disposed substantially parallel to each other (See FIGS. 1a-1b, note positioning of rotor 2 and rotor 7).

Regarding claim 31, Kaiser discloses said gear member comprises a drive section to be driven by said main rotor and a driven section for driving said additional rotor (See FIGS. 1a-1b, note item 11).

Regarding claim 32, Kaiser discloses a transmission ratio of a gear chain comprising said main rotor, said gear member, and said additional rotor is not equal to 1 (See col. 6, lines 30-32).

Regarding claim 44, Kaiser discloses a method for determining an absolute steering wheel angle of a steering wheel cooperating with a steering column (See FIGS. 1a-1b, item C), the method comprising the steps of:

detecting, using a first scanning unit, a rotational angular position of a main rotor, the main rotor being coupled to a steering column or a steering wheel for synchronous rotation therewith, the main rotor disposed for rotation about an axis of rotation of the steering column (See FIGS. 1a-1b, note item 2 and disclosure related thereto);

detecting, using a second scanning unit, a rotational angular position of an additional rotor, the additional rotor disposed for rotation about the axis of rotation of the steering column, the additional rotor being driven by a gear member which, in turn, is driven by the main rotor (See FIGS. 1a-1b, note items 7 and 11 and disclosure related thereto); and

determining the absolute steering wheel angle using output signals of the first and the second scanning units (See FIGS. 1a-1b, note item 13 and disclosure related thereto).

Regarding claim 45, Kaiser discloses the absolute steering wheel angle is within an interval of 0.degree. to 360.degree. (See FIGS. 1a-1b, note rotor 2 is for within one revolution absolute angle determination).

Regarding claim 46, Kaiser discloses the absolute steering wheel angle is a multiple of an interval between 0.degree. and 360.degree (See FIGS. 1a-1b, note combination of within one revolution rotor 2 and multiple rotation rotor 7 allows for 4 revolutions of angle determination).

Claims 24, 29 and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Onishi et al. (US2004/0145364), hereinafter Onishi.

Regarding claim 24, Onishi discloses a steering angle sensor for measuring a steering angle of a steering wheel mounted to a steering column, the steering column having an axis of rotation (See Onishi paragraph 0001), the sensor comprising:

a main rotor, said main rotor coupled to the steering column or to the steering wheel for synchronous rotation therewith about the steering column axis of rotation (See FIG. 6, item 11);

a least one additional rotor disposed for rotation about the steering column axis of rotation (See FIG. 6, item 31. Note definition of about includes "in the vicinity of" and

thus rotor 31 shown in this figure is in the vicinity of the steering column axis that runs through rotor 11);

a first scanning unit for scanning a rotational angular position of said main rotor (See FIG. 6, item 19);

a second scanning unit for scanning a rotational angular position of said additional rotor (See FIG. 6, item 33); and

at least one gear member cooperating between said main rotor and said additional rotor, said gear member being driven by said main rotor and driving said additional rotor (See FIG. 6, item 12).

Regarding claim 29, Onishi discloses an axis of rotation of said main rotor and an axis of rotation said additional rotor are mutually offset (See FIG. 6, note positioning of rotor 11 and rotor 31).

Regarding claim 33, Onishi discloses a transmission ratio of a gear chain comprising said main rotor, said gear member, and said additional rotor has a numerical value which is a positive real number but not a positive integer (See FIGS. 6-7, note gears 31, 12 and 11, wherein the gear ratio between the main rotor 11 and 31 is not an integer as shown in FIG. 7B, wherein the gear 31 rotates between 5 and 6 times for each rotation of the gear 11).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 24, 34-36 and 38-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaughn (US5880367) in view of Seger et al. (US7307415), hereinafter Seger.

Regarding claim 24, Vaughn teaches a steering angle sensor for measuring a steering angle of a steering wheel mounted to a steering column, the steering column having an axis of rotation (See Vaughn FIGS. 1-2, note steering column 12 with steering angle sensor comprising magnet members attached to column and sensors in housing there around). However, Vaughn does not explicitly teach the sensor comprising gearing.

Seger teaches an angle sensor for measuring an angle of a shaft, the shaft having an axis of rotation, the sensor comprising:

a main rotor, said main rotor coupled to the steering column or to the steering wheel for synchronous rotation therewith about the steering column axis of rotation (See FIGS. 1-6, note rotor having item 3 thereon);

a least one additional rotor disposed for rotation about the steering column axis of rotation (See FIGS. 1-6, note rotor having item 5 thereon);

a first scanning unit for scanning a rotational angular position of said main rotor (See FIGS. 1-6, note sensors 6 for magnet 3);

a second scanning unit for scanning a rotational angular position of said additional rotor (See FIGS. 1-6, note sensors 6 for magnet 5); and

at least one gear member cooperating between said main rotor and said additional rotor, said gear member being driven by said main rotor and driving said additional rotor (See FIGS. 1-6, note item 17).

It would have been obvious to incorporate the angular position sensor of Seger into the steering wheel sensor of Vaughn, such that sensing shaft of Seger (FIG. 6, item 2) is the steering column of Vaughn, (See FIG. 2, item 12). One having ordinary skill in the art would do so to provide a sensor for a steering shaft with greatly improved accuracy over a wide range of angels, to provide an output in a binary digital format and to provide a sensor that works in a wide variety of environments (See Seger col. 3, lines 3-25).

Regarding claim 34, this combination teaches said main rotor and said additional rotor each comprise magnet sections extending over an angular region and having sectors of different polarities (See Seger FIGS. 1-6, note magnets 3 and 5), wherein said first and said second scanning units each comprise a magnetic field sensor configuration having output signals supplied to said evaluation unit to determine an absolute steering wheel angle (See Seger FIGS. 1-6, note sensors 6 for each magnet or each respective rotor).

Regarding claim 35, this combination teaches said sectors of said magnet section occupy a same angle (See Seger FIG. 3, note items 3 or 5).

Regarding claim 36, this combination teaches said main rotor and/or said additional rotor comprise at least two magnet sections (See Seger FIG. 3, note each magnet 3 or 5 has two magnet sections, i.e., a North section and a South section).

Regarding claim 38, this combination teaches said magnet sections are uniformly distributed about a circle (See Seger FIG. 3, note magnet 3 or 5).

Regarding claim 39, this combination teaches said magnetic field sensor configuration comprises at least one analog magnetic field sensor (See Seger FIG. 3, note sensors 6 for each magnet 3 and 5).

Regarding claim 40, this combination teaches said magnetic field sensor configuration comprises two magnetic field sensors which are mutually offset (See Seger FIG. 3, note sensors 6).

Regarding claim 41, this combination teaches said magnetic field sensors are mutually offset by half an angular region occupied by one said sector (See Seger FIG. 6, note sensors 6).

Regarding claim 42, this combination teaches said magnet sections are disposed about an outer periphery of said main rotor and/or said additional rotor and said magnetic field sensor configurations are radially offset from said magnet sections (See Seger FIG. 3, note magnets 3 and 5 and note position of sensors 6 thereto).

Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vaughn in view of Seger as applied to claim 34 above, and further in view of Leonard (US2004/0217758). Regarding this claim, the noted combination teaches the features of claim 34 as discussed above, but not the use of multi-polar magnets in the rotors. Leonard teaches a rotary position transmitter for a rotor comprising a magnet having at least 5 poles (See Leonard FIG. 3B and 4, note 4 magnets having 8 magnet sections).

It would have been obvious at the time the invention was made to incorporate any number of magnet sections of more than 5 for the main rotor and more than 4 for the additional rotor in the apparatus of the noted combination in view of Leonard. One having ordinary skill in the art would do so because as noted in Leonard, shaft position sensors can be implemented with any number of appropriate numbers of magnets in order to increase the frequency and thus the resolution of the position sensor (See Leonard paragraphs 0019 and 0022).

Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vaughn in view of Seger as applied to claim 34 above, and further in view of Siess (US6512366). Regarding this claim, the noted combination teaches said magnet sections are disposed about a circle which is concentric relative to an axis of rotation of said main rotor and/or an axis of rotation of said additional rotor (See Seger FIGS. 3, note magnets 3 and 5), but not axially offset magnets. Siess teaches using axially offest magnets in its position transmitter. It would have been obvious at the time the invention was made to use either an axially or radially offset sensor in the steering position sensor of the noted combination. One having ordinary skill in the art would do so because as illustrated in Siess, either are equivalent alternatives for measuring the rotation of a shaft or other member, as long as the magnet wheel is appropriately magnetized (See Siess col. 3, lines 7-9, col. 4, lines 15-30).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENNETH J. WHITTINGTON whose telephone number is (571)272-2264. The examiner can normally be reached on Monday-Friday, 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Assouad can be reached on (571) 272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kenneth J Whittington/
Primary Examiner, Art Unit 2858

kjw